

Bruce Xi

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Education

The University of British Columbia

Vancouver, BC

Master of Engineering in Electrical and Computer Engineering, GPA 4.0

2021–Present

- Relevant courses: Deep Learning, ML Hardware Accelerator, Computer Architecture, Digital System Design, Embedded System, VLSI, IC Testing and Reliability

Imperial College London

London, UK

Bachelor of Engineering in Materials Science and Engineering

2018–2021

- Graduated with First-Class Honours
- Obtained Dean's List for three consecutive years (2018-2021)

Experience

Motorola Solutions

Vancouver, BC

Design Validation Co-op

May-Dec. 2022

- Conducted extensive camera tests in various settings, ensuring accuracy and precision
- Engineered Python-based software for test automation and data analysis, enhancing test efficiency with up to 90% automation
- Utilized FFmpeg for video processing
- Collaborated within a team using Git, Confluence, and Jira to optimize workflow efficiency

Project

Multi-agent Deep Reinforcement Learning for VLSI Routing

May-Oct. 2023

- Self-taught DRL and VLSI global routing, demonstrating initiative and commitment
- Developed a multi-agent DRL router using PyTorch and RLlib, the router was equipped with a custom GNN for enhanced policy generalization
- The proposed router outperformed an A* baseline by 2.6%

Embedded System Development

Jan.-Apr. 2023

- Engineered key components of an embedded system including a 4-way set-associative cache controller and a DRAM controller using Verilog. The cache reduced the runtime of a benchmark by 43%
- Implemented the system on an FPGA with a provided soft microcontroller
- Developed software and firmware in C that interacted with hardware using SPI, IIC, and CAN protocol
- Utilized hardware timer interrupt and designed a snake game software that ran on the embedded system

CPU Architecture Design

June-Sept. 2022

- Architected a 16-bit RISC CPU from the ground up using Verilog, integrating pivotal components such as FSM, datapath, RAM, and I/O interfaces
- The CPU supported 13 diverse instructions encompassing ALU operations, memory access, and branching mechanisms
- Successfully deployed the system onto an FPGA and validated the design's capabilities by executing a test program

System-on-Chip Design

Jan.-Apr. 2022

- Designed an SoC which was implemented on an FPGA using Quartus IP Catalog, the system consisted of a soft CPU, an on-chip memory, a memory-mapped interconnect, and I/Os
- Designed custom hardware using Verilog that adhered to the interconnect's communication protocol
- Scripted C programs to interact with the system

Skills

Hardware: Verilog, FPGA, ModelSim, Quartus, Cadence

Software: Python, C, Assembly, Linux

DevOps Tools: Confluence, Jira, Git, GitHub